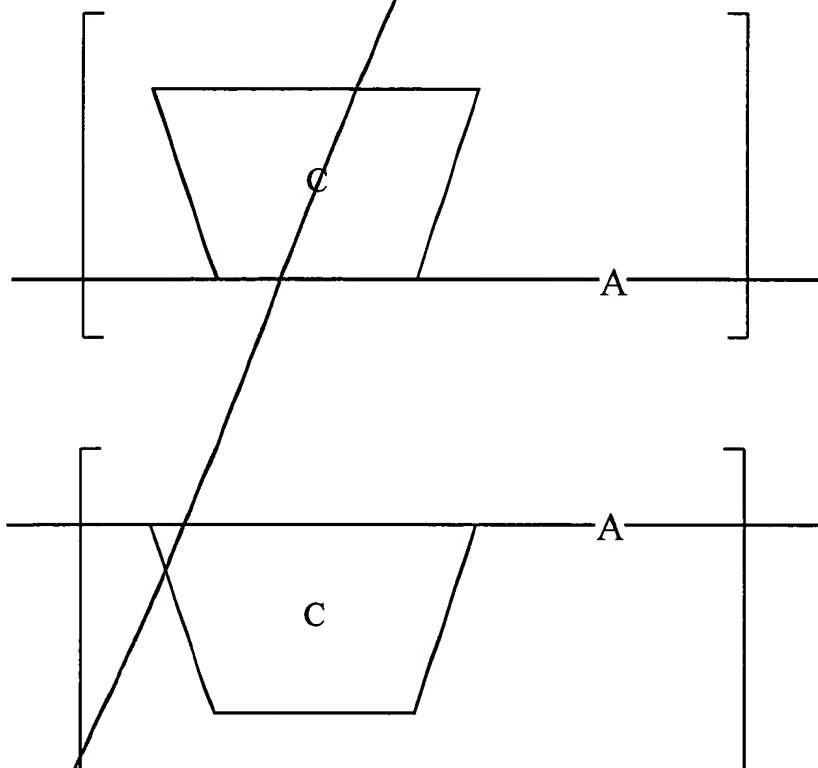


The claimed invention is:

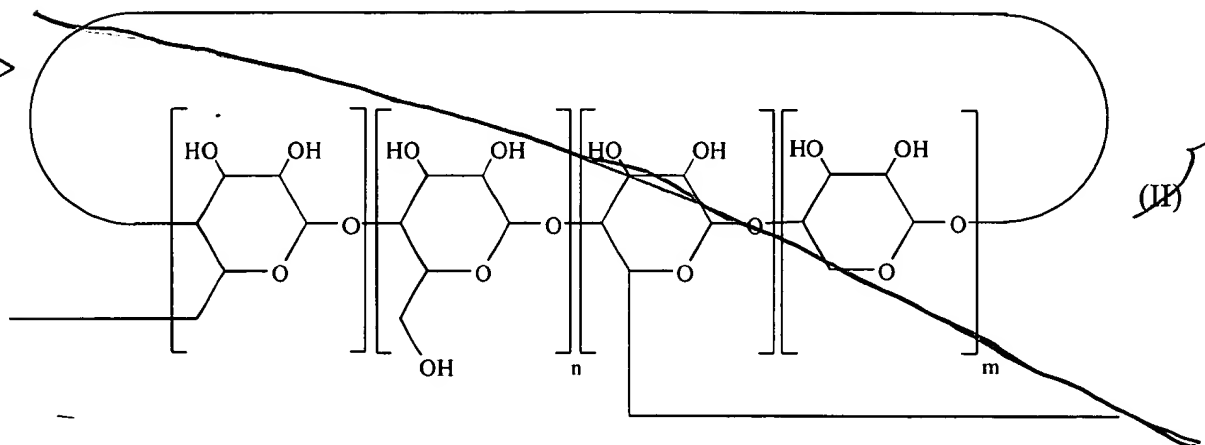
- a
1. A linear cyclodextrin copolymer comprising a repeating unit of formula Ia, Ib, or a combination thereof:



wherein C is a substituted or unsubstituted cyclodextrin monomer and A is a comonomer bound to cyclodextrin C.

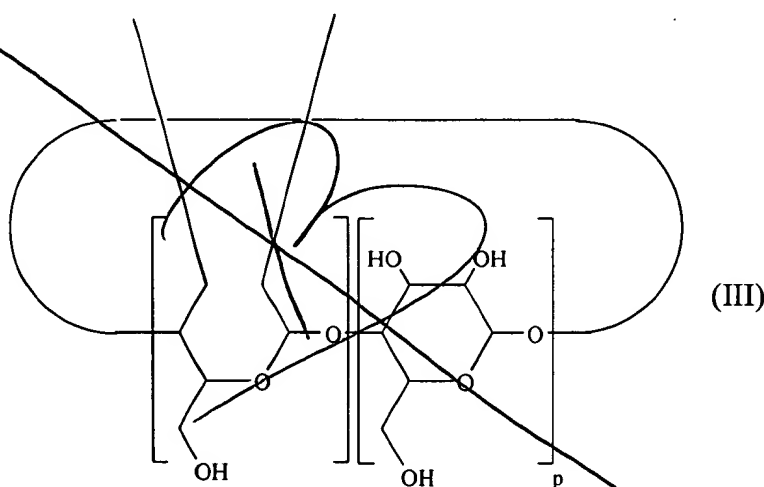
2. A cyclodextrin copolymer of claim 1, wherein said cyclodextrin monomer is an α -, β -, γ -cyclodextrin, or combination thereof.

3. A cyclodextrin copolymer of claim 1, wherein said cyclodextrin monomer has the general formula (II):

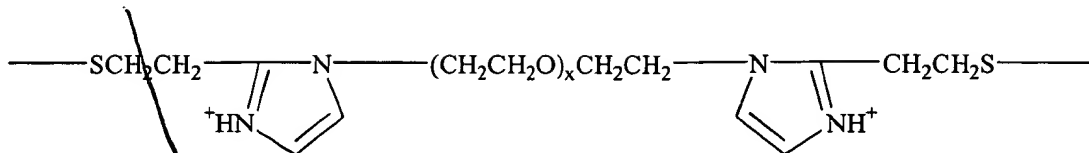


and is selected from the group consisting of: 6^A,6^B-deoxy- α -cyclodextrin ($n=0$, $m=4$), 6^A,6^C-deoxy- α -cyclodextrin ($n=1$, $m=3$), 6^A,6^D-deoxy- α -cyclodextrin ($n=2$, $m=2$), 6^A,6^B-deoxy- β -cyclodextrin ($n=0$, $m=5$), 6^A,6^C-deoxy- β -cyclodextrin ($n=1$, $m=4$), 6^A,6^D-deoxy- β -cyclodextrin ($n=2$, $m=3$), 6^A,6^B-deoxy- γ -cyclodextrin ($n=0$, $m=6$), 6^A,6^C-deoxy- γ -cyclodextrin ($n=1$, $m=5$), 6^A,6^D-deoxy- γ -cyclodextrin ($n=2$, $m=4$), and 6^A,6^E-deoxy- γ -cyclodextrin ($n=3$, $m=3$).

4. A cyclodextrin copolymer of claim 1, wherein said cyclodextrin monomer has the general formula (III):



and



where $x = 1-50$, and $y+z=x$.

54. A cyclodextrin copolymer of claim 1, wherein A is biodegradable or acid-labile.

56. A cyclodextrin copolymer of claim 1, ^{further comprising} wherein the cyclodextrin copolymer is crosslinked to a polymer.

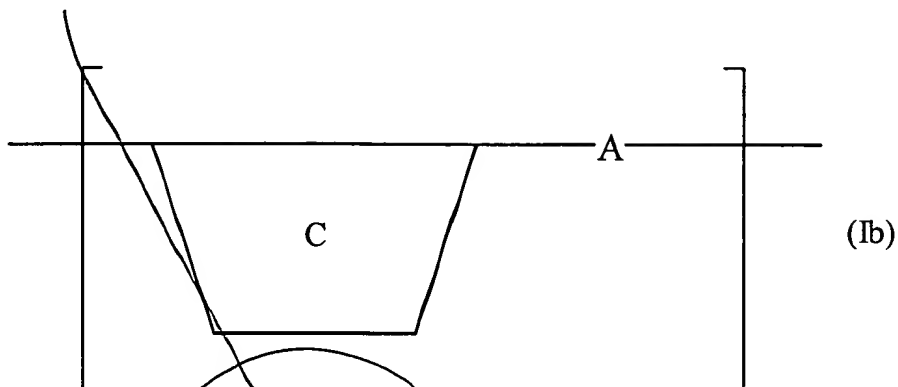
58. A cyclodextrin copolymer of claim 1, ^{further comprising} wherein at least one ligand is bound to the linear cyclodextrin copolymer.

60. A cyclodextrin copolymer of claim 1, ^{further comprising} wherein at least one ligand is bound to the linear cyclodextrin copolymer.

11. A cyclodextrin copolymer of claim 1, wherein at least one cyclodextrin monomer C is oxidized.

12. A cyclodextrin copolymer of claim 11, wherein said cyclodextrin monomer ^C is an α -, β -, γ -cyclodextrin, or combination thereof.

13. A cyclodextrin copolymer of claim 11, wherein the cyclodextrin copolymer is crosslinked to a polymer.



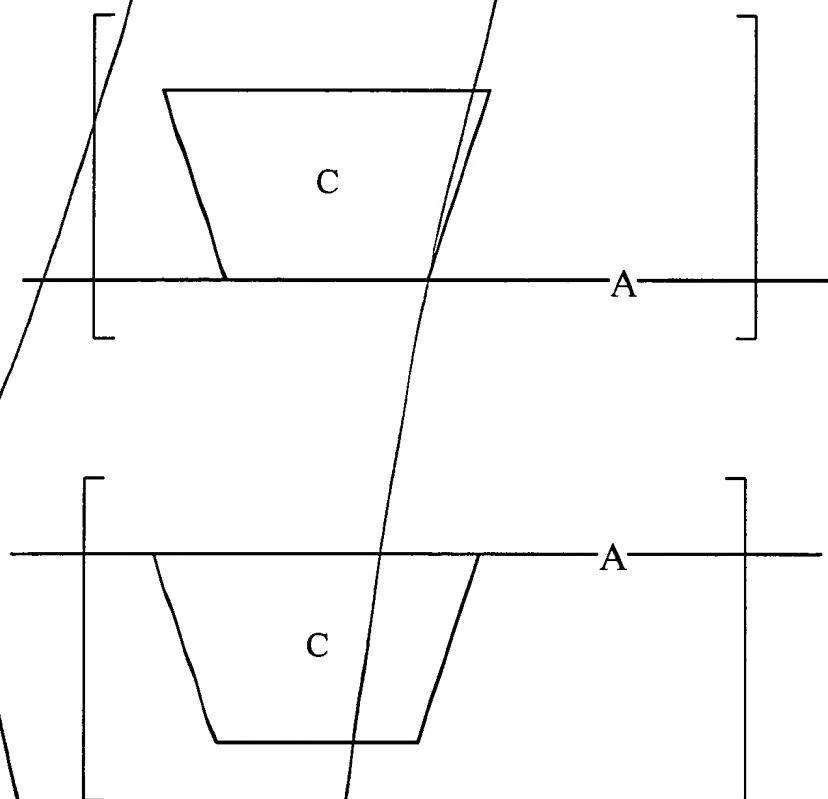
wherein C is a substituted or unsubstituted cyclodextrin monomer and A is a comonomer bound to cyclodextrin C; and

a second linear cyclodextrin copolymer comprising a repeating unit of formula Ia, Ib, or a combination thereof wherein at least one cyclodextrin monomer C of said second linear cyclodextrin copolymer is oxidized.

20. A composition of claim 19, wherein at least one of said first linear cyclodextrin copolymer and said second linear cyclodextrin copolymer is crosslinked to another polymer.
21. A composition of claim 20, wherein at least one ligand is bound to at least one of said first linear cyclodextrin copolymer and said second linear cyclodextrin copolymer.
22. A composition of claim 19, wherein at least one ligand is bound to at least one of said first linear cyclodextrin copolymer and said second linear cyclodextrin copolymer.
23. A therapeutic composition comprising a cyclodextrin composition of claim 19, 20, 21 or 22 and a therapeutic agent.

24. A method of preparing a linear cyclodextrin copolymer comprising the steps of:

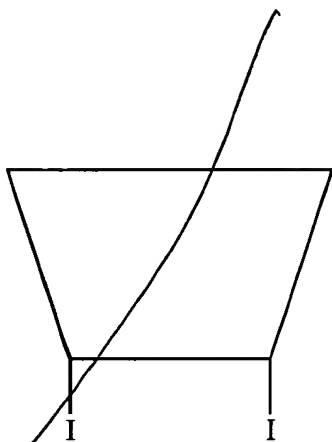
copolymerizing a cyclodextrin monomer precursor, where said cyclodextrin monomer precursor is disubstituted with the same or different leaving group, with a comonomer A precursor capable of displacing said leaving groups to form a linear cyclodextrin copolymer having a repeating unit of formula Ia, Ib, or a combination thereof:



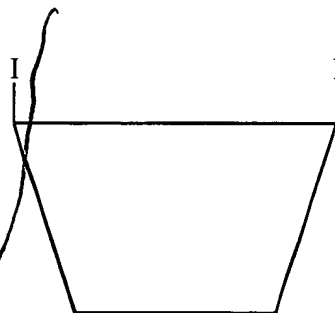
wherein C is a substituted or unsubstituted cyclodextrin monomer and A is a comonomer bound to cyclodextrin C.

25. A method of preparing a linear cyclodextrin copolymer of claim 24, wherein said disubstituted cyclodextrin monomer precursor is a diiodinated cyclodextrin monomer precursor of formula IVa, IVb, IVc or a mixture thereof:

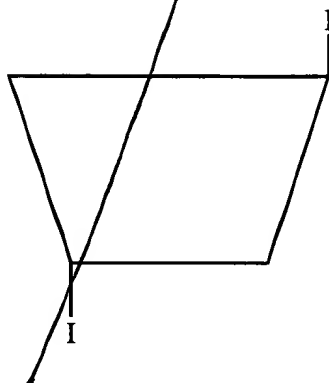
66



(IVa),
Λ



(IVb), and
Λ



(IVc),
Λ

and

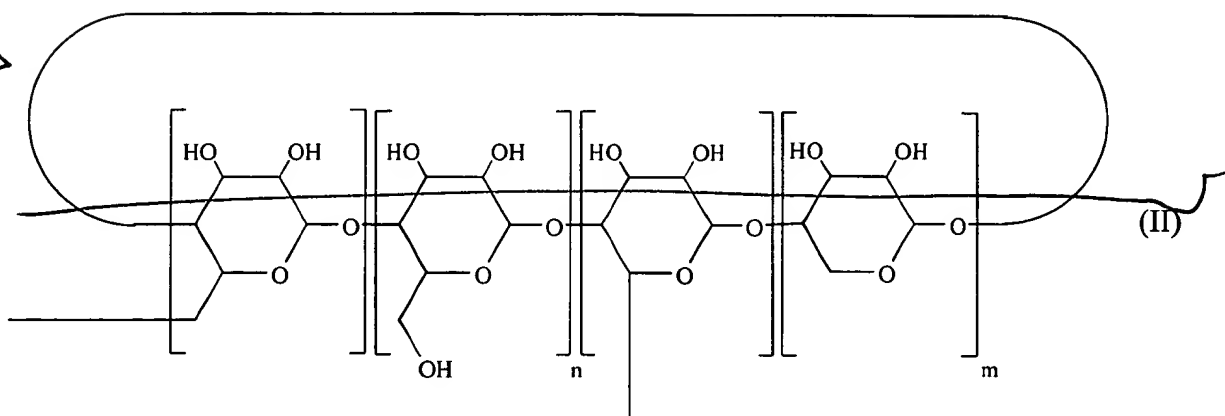
26.

A method of claim 24, wherein said cyclodextrin monomer C is an α -, β -, γ -cyclodextrin or combination thereof.

27.

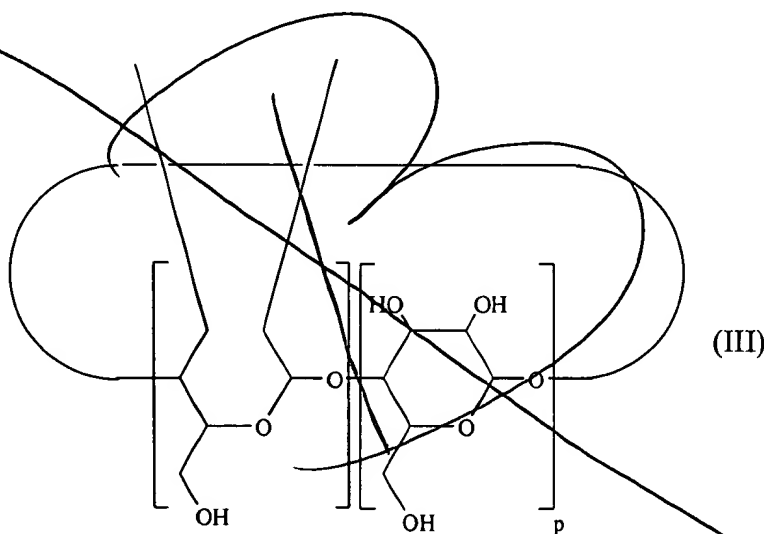
(II):

A method of claim 24, wherein said cyclodextrin monomer has the general formula



and is selected from the group consisting of: 6^A,6^B-deoxy- α -cyclodextrin (n=0, m=4), 6^A,6^C-deoxy- α -cyclodextrin (n=1, m=3), 6^A,6^D-deoxy- α -cyclodextrin (n=2, m=2), 6^A,6^B-deoxy- β -cyclodextrin (n=0, m=5), 6^A,6^C-deoxy- β -cyclodextrin (n=1, m=4), 6^A,6^D-deoxy- β -cyclodextrin (n=2, m=3), 6^A,6^B-deoxy- γ -cyclodextrin (n=0, m=6), 6^A,6^C-deoxy- γ -cyclodextrin (n=1, m=5), 6^A,6^D-deoxy- γ -cyclodextrin (n=2, m=4), and 6^A,6^E-deoxy- γ -cyclodextrin (n=3, m=3).

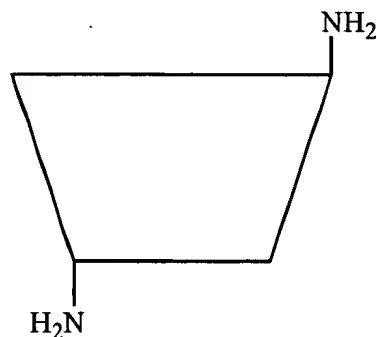
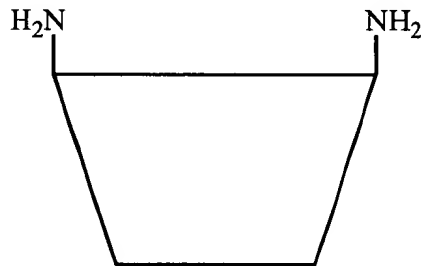
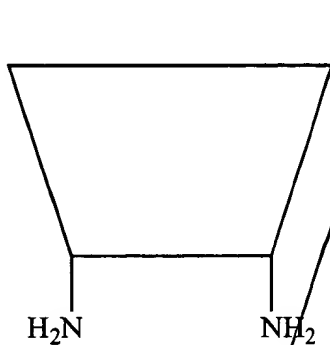
28. A method of claim 24, wherein said cyclodextrin monomer has the general formula (III):



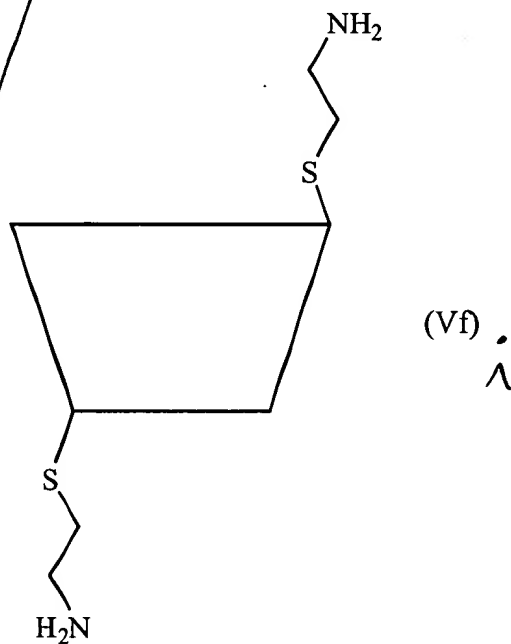
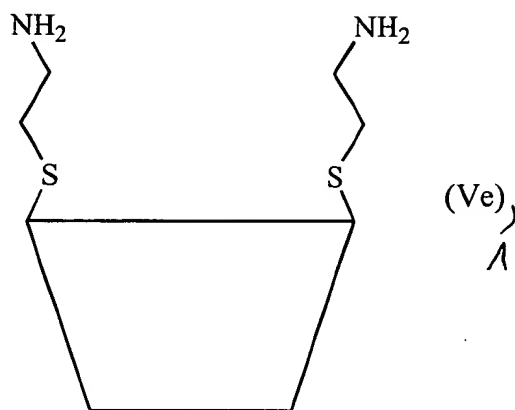
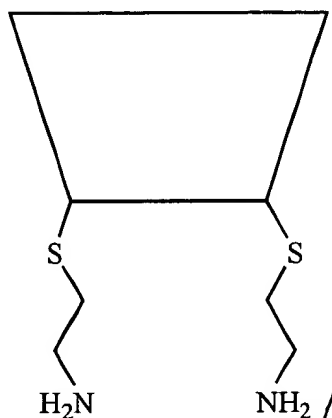
2/16/15
10
31. A method of claim 24 further comprising the step of reacting said linear cyclodextrin copolymer with a ligand to form a linear cyclodextrin copolymer having at least one ligand bound to the copolymer.

16
32. A method of claim 25, further comprising the step of aminating said diiodinated cyclodextrin monomer precursor to form a diaminated cyclodextrin monomer precursor; and copolymerizing said diaminated cyclodextrin monomer precursor to form said cyclodextrin copolymer having a repeating unit of formula Ia, Ib, or a combination thereof.

17
33. A method of claim 32, wherein said diaminated cyclodextrin monomer precursor is of formula Va, Vb, Vc or a mixture thereof:



18 ~~34~~ A method of claim ~~32~~ ¹⁶, wherein said diaminated cyclodextrin monomer precursor is of formula Vd, Ve, Vf or a mixture thereof:

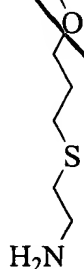


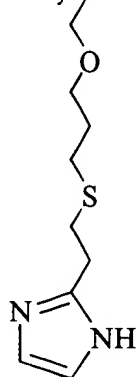
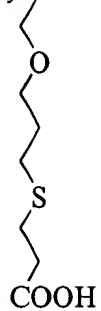
35. A method of preparing a linear cyclodextrin copolymer comprising the step of reducing a linear oxidized cyclodextrin copolymer, with the proviso that said linear oxidized cyclodextrin copolymer does not contain a reducible comonomer A.

where p = 5-7.

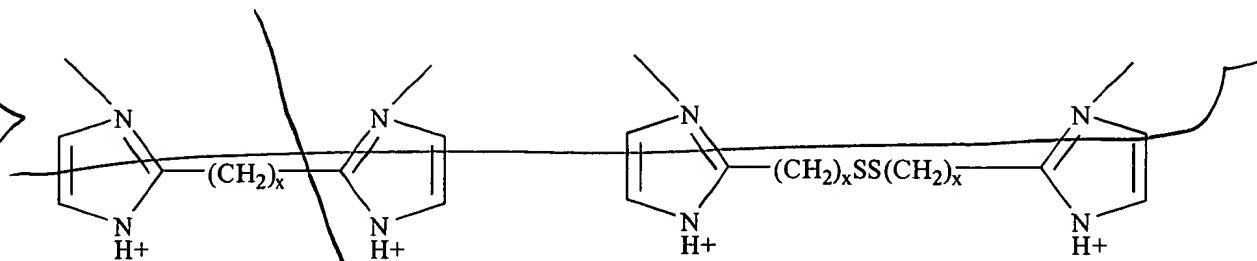
5. A cyclodextrin copolymer of claim 4, wherein said cyclodextrin monomer is selected from the group consisting of 2^A,3^A-deoxy-2^A,3^A-dihydro- α -cyclodextrin, 2^A,3^A-deoxy-2^A,3^A-dihydro- β -cyclodextrin, and 2^A,3^A-deoxy-2^A,3^A-dihydro- γ -cyclodextrin.

6. A cyclodextrin copolymer of claim 1, wherein A is selected from the group consisting of: -HNC(O)(CH₂)_xC(O)NH-, -HNC(O)(CH₂)_xSS(CH₂)_xC(O)NH-,
-⁺H₂N(CH₂)_xSS(CH₂)_xNH₂⁺-, -HNC(O)(CH₂CH₂O)_xCH₂CH₂C(O)NH-,
~~-HNNHC(O)(CH₂CH₂O)_xCH₂CH₂C(O)NHNH⁺-,~~ -⁺H₂NCH₂(CH₂CH₂O)_xCH₂CH₂CH₂NH₂⁺-,
-HNC(O)(CH₂CH₂O)_xCH₂CH₂SS(CH₂CH₂O)_xCH₂CH₂C(O)NH-,
-HNC(NH₂⁺)(CH₂CH₂O)_xCH₂CH₂C(NH₂⁺)NH-,
-SCH₂CH₂NHC(NH₂⁺)(CH₂)_xC(NH₂⁺)NHCH₂CH₂S-,
-SCH₂CH₂NHC(NH₂⁺)(CH₂)_xSS(CH₂)_xC(NH₂⁺)NHCH₂CH₂S-,
-SCH₂CH₂NHC(NH₂⁺)CH₂CH₂(OCH₂CH₂)_xC(NH₂⁺)NHCH₂CH₂S-,

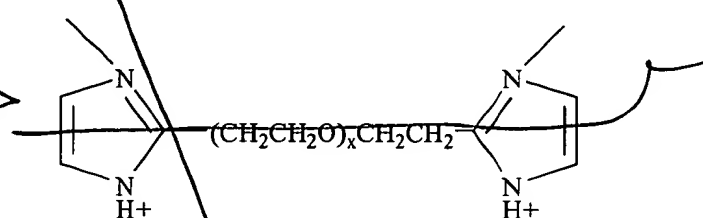




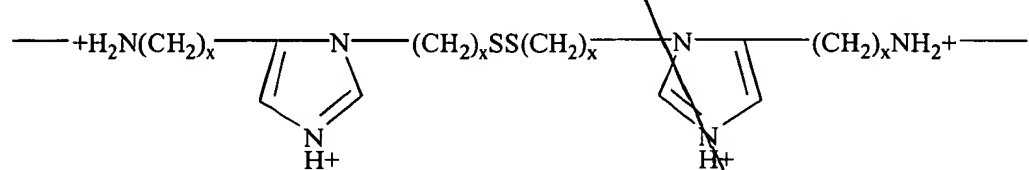
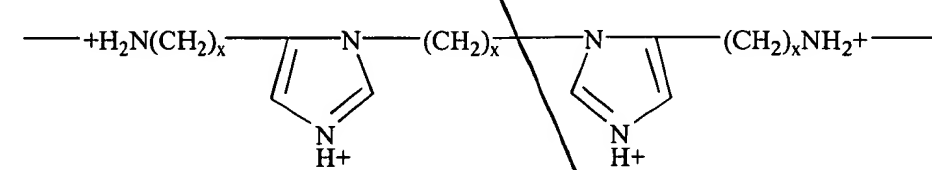
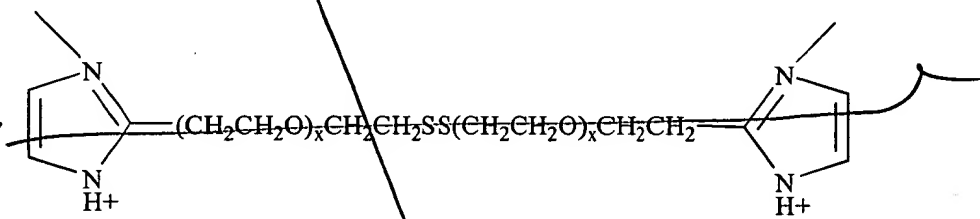
Subt
a3



Subt
a4



Subt
a5



00339818-062599

14. A cyclodextrin copolymer of claim 13, wherein at least one ligand is bound to the linear oxidized cyclodextrin copolymer.

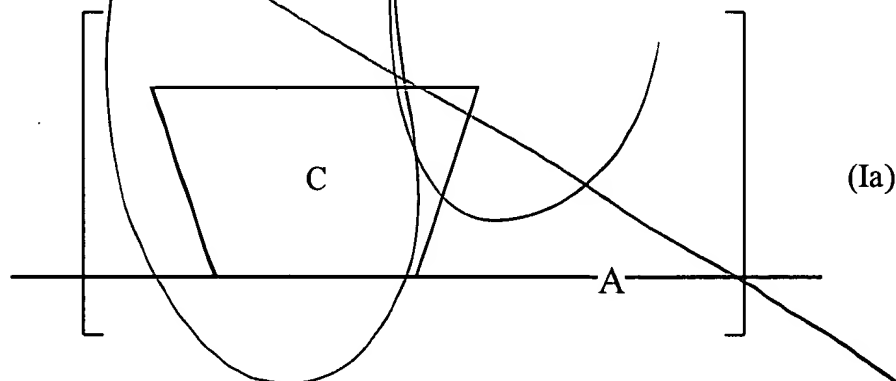
15. A cyclodextrin copolymer of claim 11, wherein at least one ligand is bound to the linear oxidized cyclodextrin copolymer.

16. A cyclodextrin copolymer of claim 1, wherein substantially all of the cyclodextrin monomers are oxidized.

17. A cyclodextrin copolymer of claim 1, wherein all of the cyclodextrin monomers are oxidized.

18. A therapeutic composition comprising a cyclodextrin copolymer of claim 1, 8, 9, 10, 11, 13, 14 or 15 and a therapeutic agent.

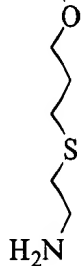
19. A cyclodextrin composition comprising:
a first linear cyclodextrin polymer comprising a repeating unit of formula Ia, Ib, or a combination thereof:

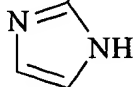


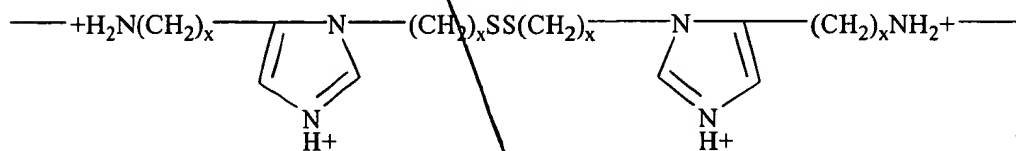
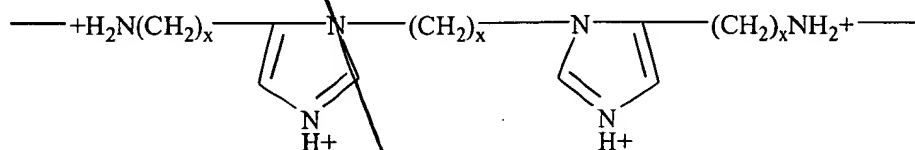
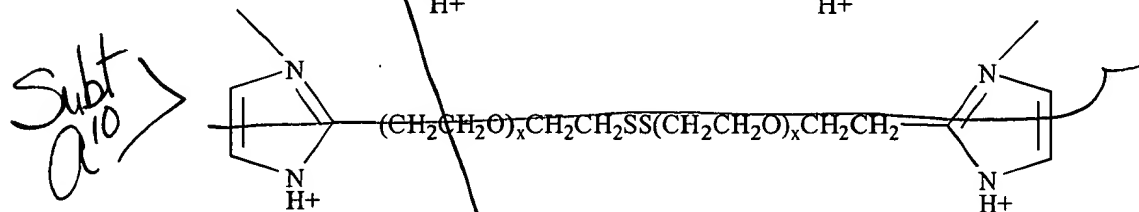
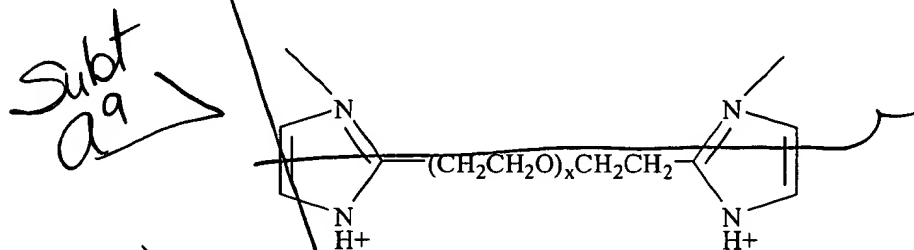
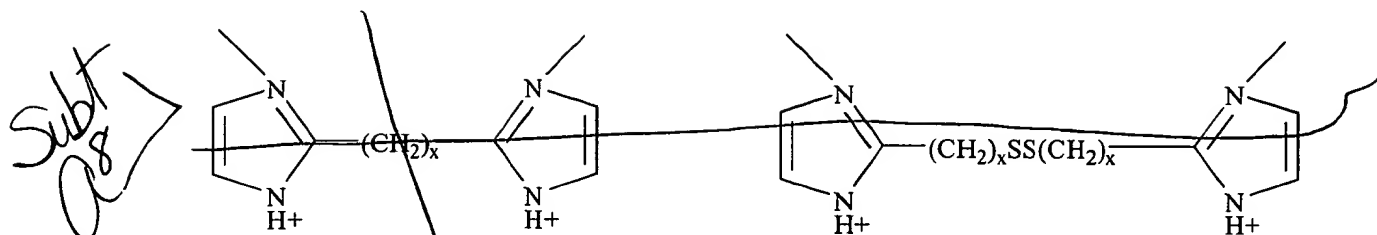
where p = 5-7.

29. A method of claim 28, wherein said cyclodextrin monomer is selected from the group consisting of 2^A,3^A-deoxy-2^A,3^A-dihydro- α -cyclodextrin, 2^A,3^A-deoxy-2^A,3^A-dihydro- β -cyclodextrin, and 2^A,3^A-deoxy-2^A,3^A-dihydro- γ -cyclodextrin.

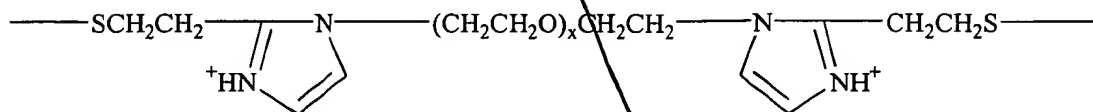
30. A method of claim 24, wherein A is selected from the group consisting of:-
HNC(O)(CH₂)_xC(O)NH-, -HNC(O)(CH₂)_xSS(CH₂)_xC(O)NH-,
-⁺H₂N(CH₂)_xSS(CH₂)_xNH₂⁺-, -HNC(O)(CH₂CH₂O)_xCH₂CH₂C(O)NH-,
~~-HNC(O)(CH₂CH₂O)_xCH₂CH₂C(O)NH-~~, -⁺H₂NCH₂(CH₂CH₂O)_xCH₂CH₂CH₂NH₂⁺-,
-HNC(O)(CH₂CH₂O)_xCH₂CH₂SS(CH₂CH₂O)_xCH₂CH₂C(O)NH-,
-HNC(NH₂⁺)(CH₂CH₂O)_xCH₂CH₂C(NH₂⁺)NH-,
-SCH₂CH₂NHC(NH₂⁺)(CH₂)_xC(NH₂⁺)NHCH₂CH₂S-,
-SCH₂CH₂NHC(NH₂⁺)(CH₂)_xSS(CH₂)_xC(NH₂⁺)NHCH₂CH₂S-,
-SCH₂CH₂NHC(NH₂⁺)CH₂CH₂(OCH₂CH₂)_xC(NH₂⁺)NHCH₂CH₂S-,







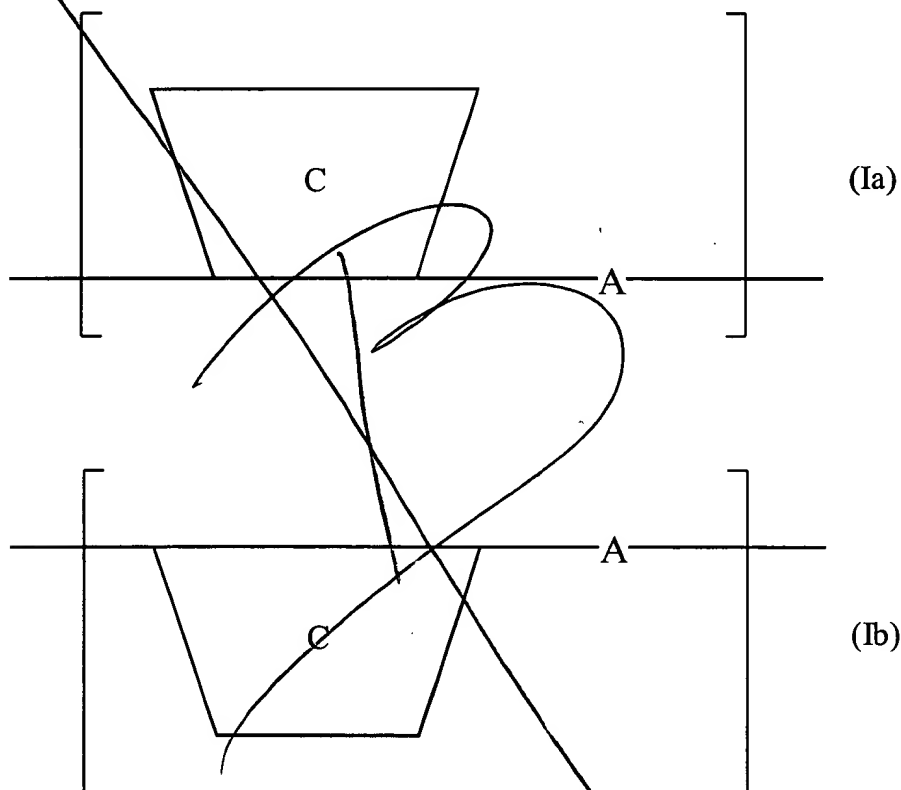
and



where $x = 1-50$, and $y+z=x$.

36. A method of preparing a linear oxidized cyclodextrin copolymer comprising the step of:

oxidizing a cyclodextrin copolymer having a repeating unit of formula Ia, Ib, or a combination thereof:

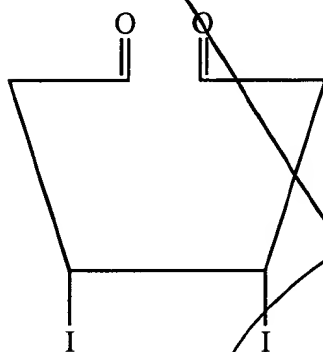


wherein C is a substituted or unsubstituted oxidized cyclodextrin monomer and A is a comonomer bound to cyclodextrin monomer C.

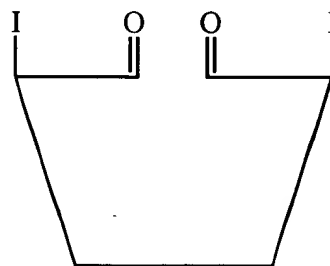
37. A method of claim 34 further comprising the step of reacting said linear oxidized cyclodextrin copolymer with a ligand to form a linear oxidized cyclodextrin copolymer having at least one ligand bound to the copolymer.

38 A method of preparing a linear oxidized cyclodextrin copolymer comprising the steps of:

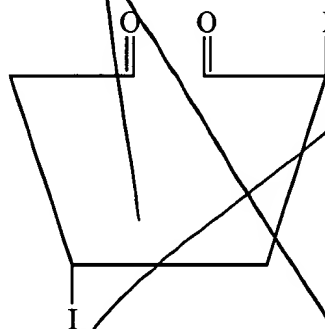
(a) iodinating an oxidized cyclodextrin monomer precursor to form an oxidized diiodinated cyclodextrin monomer precursor of formula VIIa, VIIb, VIIc or a mixture thereof:



(VIIa)



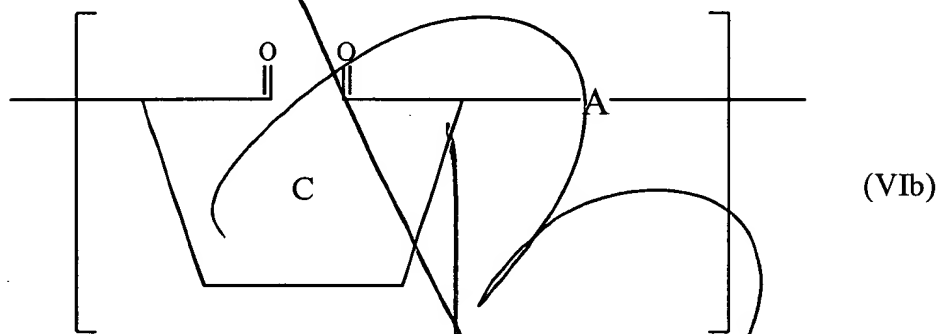
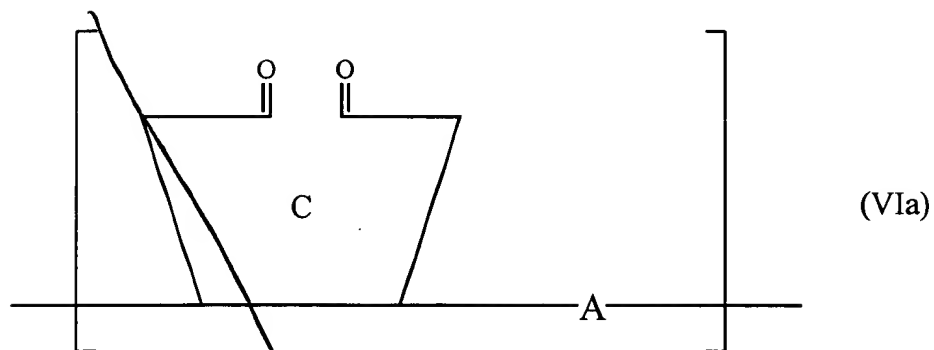
(VIIb)



(VIIc)

and

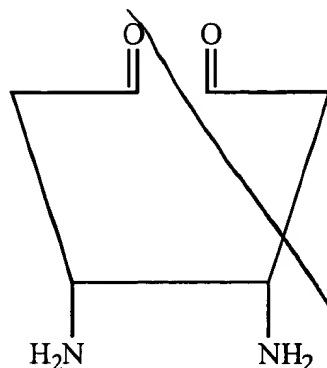
(b) copolymerizing said oxidized diiodinated cyclodextrin monomer precursor with a comonomer A precursor to form a linear oxidized cyclodextrin copolymer having a repeating unit of formula VIa, VIb, or a combination thereof



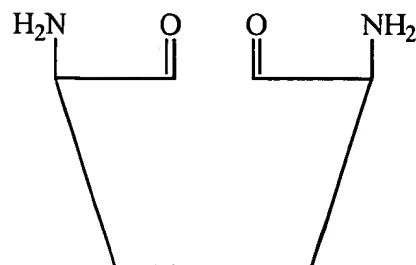
wherein C is a substituted or unsubstituted oxidized cyclodextrin monomer and A is a comonomer bound to the cyclodextrin monomer C.

39. A method of claim 38 further comprising the step of reacting said linear oxidized cyclodextrin copolymer with a ligand to form a linear oxidized cyclodextrin copolymer having at least one ligand bound to the copolymer.

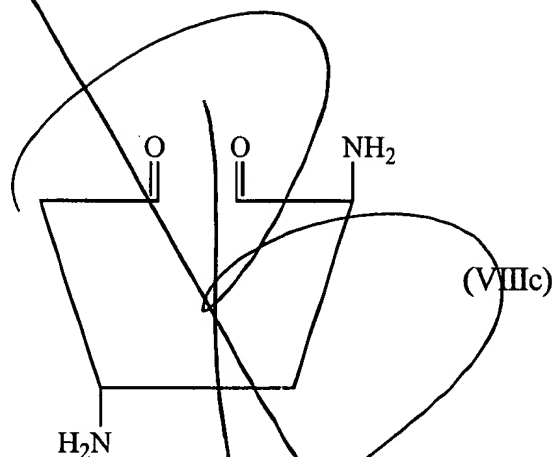
40. A method of claim 38 further comprising the steps of aminating said oxidized diiodinated cyclodextrin monomer precursor to form an oxidized diaminated cyclodextrin monomer precursor of formula VIIIa, VIIIb, VIIIc or a mixture thereof:



(VIIIa)



(VIIIb)

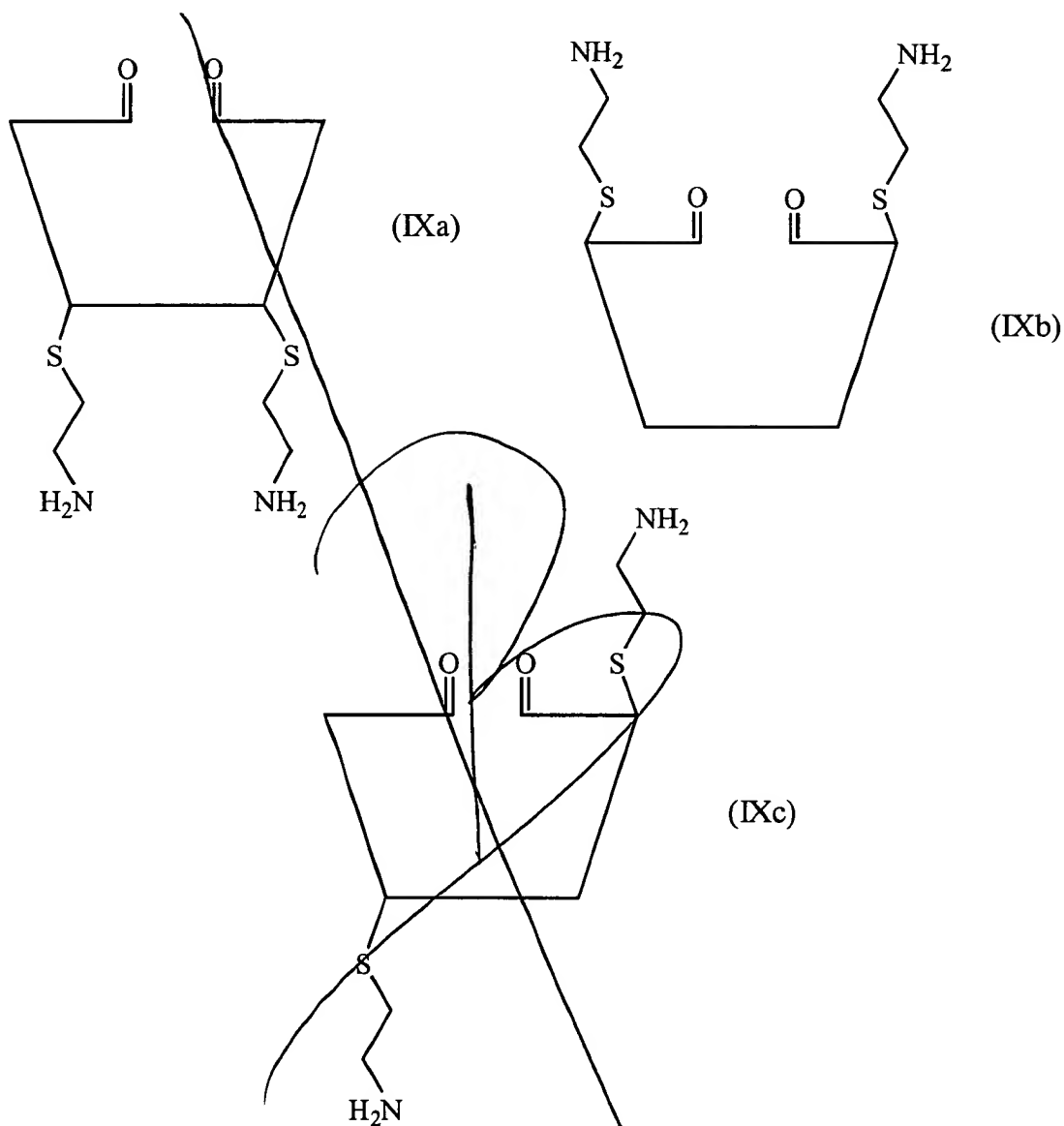


(VIIIc)

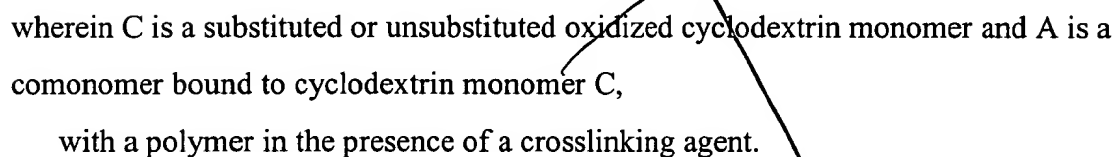
and

copolymerizing said oxidized diaminated cyclodextrin monomer precursor with a comonomer A precursor to form said linear oxidized cyclodextrin copolymer having a repeating unit of formula VIa, VIb, or a combination thereof.

41. A method of claim 38 further comprising the steps of aminating said oxidized diiodinated cyclodextrin monomer precursor to form an oxidized diaminated cyclodextrin monomer precursor of formula IXa, IXb, IXc or a mixture thereof:



42. A method of producing a crosslinked cyclodextrin polymer comprising the step of:
reacting at least one linear cyclodextrin copolymer having a repeating unit of formula Ia, Ib,
or a combination thereof:



44. ~~A method of treatment comprising the step of administering a therapeutically effective amount of a therapeutic composition of claim 18.~~ ^{delivering a therapeutic agent}

45. A method of treatment comprising the step of administering a therapeutically effective amount of a therapeutic composition of claim 23.

add

add
38

add c^5